STRATEGY RESEARCH PROJECT

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THE IMPACT OF 'INFORMATION AGE' TECHNOLOGY ON LEADERSHIP, AND BATTLEFIELD COMMAND, CONTROL AND COMMUNICATION (C^3)

BY

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THE IMPACT OF 'INFORMATION AGE' TECHNOLOGY ON LEADERSHIP, AND BATTLEFIELD COMMAND, CONTROL AND COMMUNICATION (C^3)

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ABSTRACT

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Modern man, and more specifically the military man, continues to have a fascination with technology. The leaders of the twenty first century will need to assimilate sufficient tactical and technical skills and insight to anticipate, welcome and use ever increasing technological advances. This paper explores the thesis that 'information age' technology will significantly change the way we do business and enhance our chances for victory on tomorrow's battlefields. The paper begins with a hypothetical scenario that describes the potential utilization of 'information age' technology in future wars, it further addresses, 'Who will led?' in this "high tech" environment, the impact of new technology on leadership characteristics and the effect of technology on command, control and communication.

PART I: PROLOGUE AND INTRODUCTION

PROLOGUE

Modern man, and more specifically the military man, continues to have a fascination with technology. Although the current technological movement is meeting strong resistance from many in the military community, I proclaim my allegiance to this evolution. This proclamation reflects the commitment and faith I have that technology will play a significant role in determining how we will fight future wars. My thesis is that, 'information age' technology will significantly change the way we do business and enhance our chances for victory on tomorrow's battlefields.

First, I will present a hypothetical scenario to describe the potential utilizations of 'information age' technology in future wars. I will also touch on "Who will lead?" in this section. Next, I will address some common objections and concerns about new technology. Then, I will examine some leadership characteristics and consider how 'information age' technology may impact them. The characteristics I will discuss are: effective command and control, always being at the decisive point, accurate visualization of the battlefield, and detailed planning. Finally, I will examine how 'information age' technology will change how we command, control and communicate.

INTRODUCTION

Battle leaders at all levels have sought control out of chaos. In the past, we used specially designed formations, unique procedures and a myriad of signaling devices to help make sense out of the chaos. 'Information age' technology will enable us to reduce chaos through shared knowledge and awareness -- producing a common, relevant picture.

General consensus exists that 'information age' technology will play a leading role in determining the shape of Force XXI. The March 1993 Advanced Warfighting Demonstration (AWD), the December 1993 Advanced Warfighting Simulation Experiment and the Advanced Warfighting Experiment (AWE) held in April 1994 all demonstrated the power of information and 'information age' technology to drive performance. Their effective use enhanced tempo, lethality and survivability.

PART II: HYPOTHETICAL SCENARIO AND WHO WILL LEAD?

HYPOTHETICAL SCENARIO

What follows is a hypothetical scenario -- an account of a conflict between two military superpowers using conventional 'information age' technology in the year 2020. This is not a

prediction of any future crisis, but only a vehicle to describe the potential and utilization of 'Information Age' technology (Information in Warfare) and Information Warfare in future wars.

OPERATION MAINLAND BLITZ

All efforts to normalize ties with China during previous years fail. The balance of power in Asia changes to the detriment of the democratic countries of the region. Strategically, China is the number one contributor to the proliferation of weapons of mass destruction. They continue to sell nuclear weapons to Pakistan and other countries of the region. Its clout on the world stage grows to a level that affords it the recognition of a superpower. Despite Washington's bans on arms sales and high-technology transfers to China, advancements in the country continue.

During the period 2010-2015, the United States exchanges its latest military-related technology from American companies to China, which later opens the way to direct government-to-government arms sales and cooperative weapons venture development programs. At that time, the rationale for this seems harmless enough; the administration is attempting to provide assistance to American businesses. Additionally, Congress is convinced by the administration that it is in our security interest to strengthen the military capability of China. This is done with the

objections of Russia, India, Taiwan and several Southeast Asian countries. These actions are done in an attempt to prevent the U.S. and China from drifting into a Cold War.

In 2010, the People's Liberation Army (PLA) in China embarks on the largest military build-up in the history of the world. It increases from a 3 million man active force, with 14 ICBM's, inadequate equipment and an obsolete doctrine to a 5 million man active force with thousands of nuclear capable ICBM's with fully modernized, "high tech" equipment, and a new battle proven doctrine. Their doctrine shifts from an active defense focusing on a Soviet invasion, to one with an offensive focus designed to prosecute local and worldwide wars.

China's new regime continues to be hostile to the values and interests of most Americans. It successfully crushes all internal movements towards democracy. China continues its hatred of the United States for our role in assisting Taiwan and Hong Kong in gaining their independence. China reverts to its "Mao Era" belief that the United States is its principal enemy.

The new regime asserts its claim on the Spratly Islands because of its interest in the oil field developments there. Additionally, it asserts claims selectively on the ASEAN nations, Taiwan, Japan and the waters around them. The Chinese Navy sinks one of Japan's ships as it attempts to traverse the waters around Japan. The Japanese Military Security Defense Force begins escorting ships. The vessels are subsequently fired upon.

The CINCPAC, Admiral William Smith, submits an OPREP-3

Pinnacle Report to the Secretary of Defense, the Honorable James Street and the Chairman of the Joint Chiefs of Staff, General James Jones, providing information about the activity in his Area of Responsibility. Armed with the CINC's report and analysis from the Defense Intelligence Agency (DIA), Mr. Street (SECDEF) prepares to brief the military aspects of the event to President Ralph Hill. General Jones (CJCS) provides direction to the Joint Staff and shares the information with the Service Chiefs and stands by to brief the President.

Admiral Smith (CINCPAC) directs his staff to formulate a picture of the readiness of his assigned forces and the "forces for planning". He gives specific direction on how he wants to enhance the preparedness posture of his units.

In his Commander's Assessment, Admiral Smith (CINCPAC) informs the SECDEF and the CJCS that the situation continues to be volatile and China is mobilizing its forces. The next day, Mr. Street (SECDEF) briefs the President and discusses the national security implications. General Jones (CJCS) concludes that a military option should be prepared. The following day, the National Command Authority (NCA) identifies national interests and objectives and considers possible diplomatic, information, economic and military alternatives to achieve the objectives.

Both General Jones' (CJCS) and Admiral Smith's (CINCPAC) staffs dust off existing OPLANs and CONPLANs from the Joint Operations and Execution System (JOPES) that fit the situation

and anticipated actions, if events ensue. The following week, President Hill summons his key advisors and cabinet members for a meeting at the White House. In attendance are the National Security Advisor, the Director of Central Intelligence, the Secretary of State, the Secretary of Defense and the Chairman of the Joint Chiefs of Staff. They discuss the potential impact on national interest, concerns about our security, the severity of the crisis, diplomatic ramifications, reaction from both allies and adversaries and the evacuation of US nationals and civilian noncombatants.

During the same day that President Hill is meeting with his "inner-circle", the Chinese take a bold action. Sensing the United States is planning to intervene in the situation, China launches a pre-emptive strike on Japan. The invasion catches the Japanese off guard, and in two days China succeeds in occupying the island. Japan calls on the United States under the long neglected U.S.-Japan Security Treaty signed in 1945. Many countries around the world express their outrage at the Chinese action.

Armed with this late breaking news and the information provided by his "inner-circle", President Hill formulates his guidance and directs the development of his Presidential Decision Directive (PDD). The PDD lays out the policy and strategy to address the crisis. The PDD states that the United States will honor its Security Treaty with Japan, and the United States would use the elements of power necessary to assist Japan in regaining

its sovereignty. President Hill immediately implements diplomatic, political and economic sanctions against China.

After receiving the CJCS planning directive in the form of a CJCS Warning Order, Admiral Smith recommends three Courses of Action (COA). COA 1: Use Information Warfare exclusively; COA 2: Conduct an invasion of Japan and expel Chinese forces; and COA 3: Invade China to destroy its military capability. General Jones (CJCS) reviews and evaluates the COA's and recommends a combination of COA's 1 and 2 to the NCA. The plan is to use Offensive 'Information Warfare' to destroy China's ability to wage war by wrecking its information infrastructure, and during the chaos, introduce a strike force onto the island to expel the occupation forces. Later that day, Mr. Street (SECDEF) brings the NCA decision to General Jones' office. General Jones (CJCS) develops a CJCS Alert Order and submits it to Mr. Street (SECDEF) for approval. Immediately after receiving the approval from the SECDEF, General Jones (CJCS) issues a CJCS Alert Order to Admiral Smith (CINCPAC), thus, implementing the NCA decision.

Admiral Smith (CINCPAC), using the approved COA, the Alert Order and final guidance from the SECDEF and CJCS, constructs his operations order. The OPORD is completed and receives the approval from General Jones (CJCS), Mr. Street (SECDEF) and President Hill in four days. Advisors inform President Hill that the sanctions are ineffective. One day later, Mr. Street (SECDEF) authorizes General Jones (CJCS) to direct Admiral Smith (CINCPAC) to implement the OPORD. General Jones (CJCS) issues

the CJCS Execute Order directing the deployment and employment of forces and designating the timing for the initiation of the operation.

The plan is put into motion. It begins with the Information Warfare Offensive on China. The strategic objective is to cripple China's ability to wage war by wrecking its information infrastructure. The targets are the decision-making process of the Chinese leaders and the will of the Chinese people. The specific goal of the U.S. forces is to destroy the country's major communication, power distribution and transportation nodes. Electromagnetic-Spectrum supremacy is established to blind critical electronic equipment. Additionally, U.S. space-based information denial systems are directed against China. Computer Warfare efforts are also launched against the Mainland. Viruses are introduced into the computer memory of many key systems to alter their operations; internal clocks are affected to throw off system synchronization which adversely affects systems abilities to communicate.

The Information Warfare Offensive on China is successful in allowing U.S. Forces to isolate the Chinese Invasion Force. The mission of expelling this force from Japan is given to Force XXI Mobile Strike Force (MSF) Alpha, commanded by MG Roy James. Force XXI MFS Alpha is a digitized combined arms force equipped with the All Sources Analysis System (ASAS), allowing the commander to access national and theater intelligence products; Global positioning systems (GPS) for enhanced precision

navigation; and Force XXI Battle Command system, enabling the force to "see" the enemy, friendly forces and terrain on their displays. Additionally, line-of-sight-antitank (LOSAT) weapons provide antitank fire to destroy enemy armored formations; the Advanced Field Artillery Systems (AFSAS) and the MLRS provide increases in accuracy, rate of fire and survivability, and the Unmanned Aerial Vehicle provides reconnaissances, surveillance, and target acquisition capability to the force.

Once the buildup is complete, MG James (CDR, MFS) commits his unit against the Chinese Corps. As a part of the preparatory fires, conventional explosives are used to generate highly directional electromagnetic pulses (EMP) to disable electronic equipment. MG James (CDR, MSF) orders his Reconnaissance Company, armed with EMP weapons, forward. The company is successful at disabling aircrafts at the airfields, missile homing sensors and seekers; many of the Chinese Force's tactical vehicles are disabled by the destruction of the vehicles' electronic ignitions. The efforts substantially alter the force ratio and disorganize the command and control of the Chinese Invasion Force.

MSF Alpha capitalizes on dispersion during its movement. The enemy is unsure when and where the MSF will attack. MFS Alpha attacks the Chinese invasion force, applying overwhelming combat power. MSF Alpha uses concentrated effects and forces. The crippled Chinese force is handedly destroyed by the combination of 'moving and striking'. MSF Alpha uses decisive

maneuver and fires at the critical places and times to eliminate the resistance. The attack shatters the Chinese Invasion Force's will, disrupts its synchronization and destroys the cohesion and willingness of its soldiers to fight.

WHO WILL LEAD?

This scenario demonstrates that the leadership challenges of the future will be very different from those faced by today's leaders. Our challenge as leaders is to take advantage of the new technologies of the 'information age' while not losing sight of our traditional leadership principles and traits. As our equipment and warfighting doctrines evolve, officers will be expected to master complex tasks involving rapid assimilation of new information, using radically different tools from those used by today's leaders.

Who will lead? In the future, the officers who are educated and trained on the new technology. It will permit such officers to look at alternatives and to use those options in ways that we can now only dream about.

PART III: CONCERNS ABOUT NEW TECHNOLOGY

CONCERNS ABOUT NEW TECHNOLOGY

People who oppose the 'information age' evolution all express similar concerns. Based on readings, seminars, and feedback received over the past two years, I conclude that many who oppose this evolution fear the loss of their traditional roles. It's a classic case of 'fear of the unknown'. These roles include skills that normally take a lifetime to develop, such as rational thinking and leadership experience.

Dr. Earl H. Tilford, Director of Studies, Strategic Studies Institute, argues that new technology can have a numbing effect on thinking.[1] Our technology is moving to a point where a battlefield commander will have perfect situation awareness. He will know exactly where he is located, where all of his forces are located and where the enemy is located. With this kind of information, much of the guess work is taken out of the planning and execution processes. Taking Dr. Tilford's argument to the extreme, future technology could reduce and , eventually, eliminate the need for intuition, experience and judgment calls, thereby, questioning the need for career specialized officers. Additionally, Dr. Tilford writes, "Technology tends to encourage conformity at the expense of individuality, and it discourages the independence of thought that fosters creativity."[2]

However, the greatest fear appears to be our dependency on systems that are extremely vulnerable to electronic counter measures and sabotage. It is true that the greater the application and the more we rely on advanced technology to enhance our military capability, the more Information Warfare opportunities are generated. Enemy forces employing Information Warfare could use techniques such as deception, electronic jamming, and advanced technologies to deceive, deny, exploit, damage, or destroy our 'information age' systems. Clearly, having numerous redundant systems and "second wave" backup systems are essential to addressing this fear.

It is unrealistic to believe 'information age' technology will eliminate the need for the critical leadership skills that have permitted us to succeed in the past. Two reasons America's Army is so successful are a high level of warfighting knowledge and the rational thinking skills of her leaders. Technology does <u>not</u> eliminate the need for these skills. On the contrary, nurturing these skills increases creativity, improves technology and generates the backup systems to ensure success.

PART IV: SUCCESSFUL LEADERSHIP IN THE 'INFORMATION AGE'

EFFECTIVE COMMAND AND CONTROL

In future wars, commanders will communicate beyond line of sight and provide near-real-time "pictures" of the battlefield to other commanders and staffs, without physically being in potentially disastrous locations. This capability is important, allowing commanders to deploy and maneuver forces, without being constrained by communications. In an environment overshadowed by weapons of mass destruction, dispersion of forces is essential to force protection and survivability. Additionally, the increased accuracy and lethality of modern weapons allows the commander to mass effects, not weapon systems. The future commander will have a digital reflection of his entire battlespace. This depiction will represent reality, thus, enhancing his ability to control his unit.

ALWAYS AT THE DECISIVE POINT

The decisive point is defined by FM 100-5 as "a point, usually geographical in nature, that, when retained provides a commander a marked advantage over his opponent."[3] There are two

critical variables to being at the decisive point. The first is locating the decisive point, and second is getting to that point. During past wars, intuition and 'gut feeling' were critical to choosing the decisive point. In future wars, situational awareness, which includes friendly and enemy force locations, will enhance the commander's ability to accurately predict where the decisive point will occur. The position navigation system and "steer-to" feature of our new tactical vehicles and global position devices will enable the commander to rapidly converge firepower on the critical location. Digitally linked ground forces and aviation will give the commander the capability to focus combat power there. He will have the tools to anticipate the enemy's actions through expanded, pinpoint accurate and timely combat information and to improve ground and air maneuver synchronization.

ACCURATE VISUALIZATION OF THE BATTLEFIELD

With the increase in accuracy and lethality of enemy weapons and the extended battlespace, personal reconnaissance by the commander is difficult, if not impossible. The personal safety of key leaders will continue to be a major consideration in future warfare. In a search to get an accurate visualization of the battlefield without physically being there, the military has turned to technology.

Intuitive commanders look at dominating the enemy by fires and maneuver, as well as within the electromagnetic spectrum. The terrain analysis feature of the All Sources Analysis System (ASAS) gives the commander an accurate visualization of the environment. Upgrades to ASAS, with the assistance of ground and aerial reconnaissance, will improve this visualization to include obstacles, cover, concealment, observation, key terrain, avenues of approach, trafficability, soil and line of sight. Improved digital images and data will provide a means to continually update for changes. Most importantly, leaders will receive this information in time to provide an appropriate response.

PLANNING IN DETAIL

In future wars, commanders will assimilate thousands of bits of information to accurately visualize the battlefield. The commander will access battlefield information through a non-hierarchical system. Commanders at all levels will receive broadcasted intelligence simultaneously or retrieve it from the information base. Technology automates planning steps and enhances the integration of relevant information from multiple sources into more precise final products. This continuous flow of intelligence will increase the accuracy of plans. Plans will be continually refined, based on new intelligence and updates made to situational awareness graphics. The commander will use

digital systems to produce and disseminate visual depictions of his intent, thus, reducing the chance of misunderstanding.

PART V: BATTLEFIELD COMMAND, CONTROL AND COMMUNICATION

COMMAND, CONTROL AND COMMUNICATIONS

Before examining how 'information age' technology will change how we command, control and communicate, we must understand the term tempo. TRADOC Pam 525-200-1 defines tempo as the measure of time between and the sustained frequency of militarily significant events. The pamphlet further states:

> Commanders seek to dictate the pace of events in the battle space to the enemy and, thus, gain and maintain the initiative. Tempo is a vital element of modern war since events are frequently news and can quickly condition strategic will to see the operation through to the end. Future battles will have an increased tempo of operations that requires the commander to be able to move his forces rapidly, destroy the enemy quickly, and reset for subsequent operations before the enemy can recover or respond.[4]

Simply put, one measures tempo by how fast a unit can reposition its forces, receive and understand messages (information), formulate decisions and plans, and process and execute orders. Conversely, tempo has a direct impact on the traditional modes leaders will use to receive information, make decisions, formulate plans, transmit information, and give orders.

RECEIVING INFORMATION

Leaders can narrow information requirements to three major factors of location. A leader wants to know -- his location, his force's location and the enemy's location. The twentieth century leader spends 95 percent of his time seeking this critical information.

In our current system, intelligence agencies or units collect enemy data from many sources. Intelligence analysts then process this information and transmit it to the organizations or units they believe have a need to know. This process repeats from theater level to battalion level often taking subordinate commanders out of the loop. As a result, intelligence analysts, not commanders, determine what information is vital.

The twenty-first century leader will receive a real-time picture of the battlefield. This leader will operate under a new concept, whereby, he collects information from all sources. At each echelon, commanders, intelligence officers and planners will extract information relevant to their areas of interest. This process will place near real-time intelligence in the hands of those most able to utilize it -- commanders and weapon system operators.

DECISION-MAKING

Decision-making remains a key component of battle command. TRADOC Pam 525-200-1 defines battle command as, "the art of battle decision making, leading, and motivating soldiers and their organizations into action to accomplish missions at least cost to soldiers."[5] Twentieth century warfare requires a leader to visualize the current battlefield situation as well as the desired end state, and then determine the most feasible means to accomplish that objective. This process includes: assigning missions, prioritizing resources, allocating resources, selecting the critical time and place to act, and knowing how and when to make adjustments during the fight.

The shortage of information and intelligence -- as well as false information -- cause the twentieth century leader to rely heavily on intuition. Intuition bridges the gap between what the commander knows as fact and what his previous experiences have taught him about battle. TRADOC Pam 525-200-1 defines intuition as, "the ability to demonstrate immediate cognition without evident rational thought and inference."[6] It is born from a range of experiences and reflections upon similar occurrences by the commander during his development as a leader.

Historically, great strategists believe intuition was a critically important leader asset. Clausewitz stated:

> Circumstances vary so enormously in war, and are so indefinable, that a vast array of factors have to be appreciated -- most in the light of probabilities alone. The man responsible for evaluating the whole

> must bring to his task the quality of intuition that perceives the truth at every point. Otherwise a chaos of opinions and considerations would arise, and fatally entangle judgement . . . .[7]

'Information age' technology will reduce, but not eliminate, the leader's need to have an innate "feel" for the battlefield. The twenty-first century leader will formulate his intent and then plan the operation based on precise intelligence. An accurate assessment of the current situation will allow him to make a very precise prediction of future operations. This scenario will also reduce the high degree of risk which accompanied most past decisions. Leaders will increasingly rely upon automated systems in the execution of many battlefield functions.

FORMULATING THE PLAN

Military plans are the products of a logical and orderly process. Once the mission is received, the staff gathers facts, and makes assumptions. It develops, analyzes and compares courses of action. Finally, the commander selects the best course of action and the staff develops the operations plan.

In such planning, time is a critical factor which leaders cannot easily overcome. Commanders and staffs must give subordinate commanders sufficient time for planning. Subordinate units should receive at least two-thirds of the available time to develop their supporting plans. In reality, this rarely happens.

The subordinate leader of the twenty-first century will have

a decisive advantage over today's leader. 'Information age' technology will allow him to plan concurrently both with the higher commander and adjacent commanders. In seconds, digitized devices will transmit products allowing constant updates throughout the planning process. Additionally, a computer-driven wargaming simulation at a tactical operations center could test various courses of action, permitting quality decisions (plans), branches and sequels.

TRANSMITTING INFORMATION

Transmitting information is a challenge for today's twentieth century warrior. Methods haven't changed significantly over the last fifty years. During briefings, staffs provide information to the leader. Leaders receive an acetated copy of the graphics and a paper copy of the operations order. All levels of command receive additional information from reports and summaries.

The twenty-first century leader will pass his orders and overlays digitally. In a matter of seconds, a data burst will leave the originator and be broadcast to all appropriate commands. Products will include video, imagery, data and voice. Leaders, at all levels, will have access to satellite communication systems. Such capabilities will enable the leader to make faster decisions and provide instant responses to

queries.

GIVING ORDERS

In the future, one role that will remain virtually unchanged is that of giving orders. The leader formulates the single, unified concept for the mission. He must be capable of directing and motivating the force to execute his decisions towards a purposeful end. State-of-the-art communication and computing systems will significantly improve the orders-passing process.

PART VI: CONCLUSION

CONCLUSION

Over time, a leader builds a solid background of professional judgments in every area of his responsibility. The leader of the twenty-first century will need to assimilate sufficient tactical and technical skills and insight to anticipate, welcome and use ever increasing technological advances. This leader will have to adapt to the rapidly changing circumstances generated by an increase in tempo.

Although many of our information systems are still evolving,

they will give us an immense increase in battlefield performance. Technology significantly enhances a leader's ability to: command and control his units; position himself at the decisive point on the battlefield; accurately visualize the battlefield without physical observation; and provide timely detailed plans to subordinates.

Many processes will remain the same. However, the tools which we will use and the speed with which we will accomplish tasks will change significantly. 'Information age' technology will allow us to reduce battlefield chaos through information accuracy, decision speed and plans formulation, and the swiftness with which the unit can process and execute orders.

The magnitude of change that 'information age' technology will make on the performance of our combat forces is limited only by our imagination and the leader's ability to creatively employ such technology. Despite the cautions expressed by some, improvements in command and control, survivability, lethality and tempo, caused by 'information age' technology will be a gigantic leap forward for our forces. Future technology will enhance our chances for victory on tomorrow's battlefields. But, it is important to remember, thinking leaders will still be required to manage this technology.

ENDNOTES

1. Earl H. Tilford Jr., Technology and War: One Historian in Cautious Reflection, "Unpublished Think Piece, Undated, 1."

2. Ibid., 4.

3. U.S. Department of the Army, Operations, Field Manual 100-5,(Washington: U.S. Department of the Army, June 1993),__.

4. U.S. Department of the Army, Battle Command, TRADOC Pamphlet 525-200-1, (Virginia: Training and Doctrine Command, 1 December 1994), 7.

5. Ibid., 3.

6. Ibid., 4.

7. Clausewitz, Carl Von, On War, translated and edited. Michael Howard and Peter Paret, (New Jersey: Princeton University Press, 1984).

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